

Notice of Allowability

Application No.

10/078,076

Examiner

Ramsey Refai

Applicant(s)

HARE ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10/27/06.
2. ☒ The allowed claim(s) is/are 1-4 and 6-19.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material

5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other

BUNJO BARNCHONWANIT
SUPERVISOR/PATENT EXAMINER

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EXAMINER' S AMENDMENT

1. Responsive to Amendment received October 27, 2006. Independent claims 1, 4, and 14 were amended. Claims 1-4 and 6-19 were pending. After the Examiner' s Amendment below, Claims 1-4 and 6-19 are allowed.

An examiner' s amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner' s amendment was given in a telephone interview with Mr. Kevin Radigan on November 21, 2006.

The claims in the application have been amended as follows:

1. (Currently Amended) A method for facilitating correct group membership by detecting the quick restart of liveness daemons in a distributed, multimode data processing system in which nodes communicate liveness indicia in the form of heartbeat signals via adapters coupled to each node, said method comprising:

experiencing at one node of a membership group, a failure and a quick restart of the one node of a membership group; wherein the failure and quick restart deletes locally stored membership group information at said one node;

subsequent to a said failure and quick restart at of the one node of a membership group, receiving a heartbeat signal at the one node from at least one other node of the membership group; at the said one node experiencing the failure and quick restart, wherein the failure and quick restart deletes locally stored membership group information at the one node and wherein

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~~the quick restart at the one node occurs prior to a detection of the failure by at least one other node and expulsion of the one node from the membership group due to the failure;~~

responsive to receipt of the heartbeat signal at the one node, sending, from the one node to the at least one other node, a first message which includes an indication of ~~at least indicia of occurrence of the quick restart at the one node, the sending being responsive to receipt of the signal at the one node;~~ and

determining, at the at least one other node, from said ~~indicia~~ indication of ~~occurrence of~~ said the quick restart in the first message and from locally stored membership group information indicating prior membership of the one node in the membership group, the ~~existence~~ occurrence of a quick restart at said one node, and responding thereto by sending a second message from the at least one other node to another node of the membership group which indicates that said one node is to be expelled from the membership group;

wherein the quick restart at the one node occurs prior to a detection of the failure by at least one other node and expulsion of the one node from the membership group due to the failure.

2. (Previously Presented) The method of claim 1 in which said second message is sent by the node that is next in line for receipt of heartbeat signals, with respect to the node that sent the first message.

3. (Currently Amended) The method of claim 1, wherein the membership group is an adapter membership group, and ~~in which said~~ indication of quick restart ~~indicia~~ are selected from the group consisting of: (1) an indication that the one node and the at least one other node are not both in the adapter membership group; (2) an indication that the one node's address is part of the

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adapter membership group according to said at least one other node; and (3) an indication of difference in instantiation number for the one node's adapter ID listed in the adapter membership group.

4. (Currently Amended) A multimode data processing system comprising:

a plurality of data processing nodes connected in a network capable of transmitting messages between nodes;

storage means within said nodes containing program code for experiencing at one node of a membership group, a failure and a quick restart of the one node of a membership group; wherein the failure and quick restart deletes locally stored membership group information at said one node;

subsequent to said failure and quick restart of the one node of a membership group, receiving a heartbeat signal at the one node from at least one other node of the membership group;

responsive to receipt of the heartbeat signal at the one node, sending, from the one node to the at least one other node, a first message which includes an indication of the quick restart at the one node,; and

determining, at the at least one other node, from said indication of the quick restart in the first message and from locally stored membership group information indicating prior membership of the one node in the membership group, the occurrence of a quick restart at said one node, and responding thereto by sending a second message from the at least one other node to another node of the membership group which indicates that said one node is to be expelled from the membership group;

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wherein the quick restart at the one node occurs prior to a detection of the failure by at least one other node and expulsion of the one node from the membership group due to the failure.

~~subsequent to a failure and quick restart at one node of a membership group, receiving a signal from at least one other node of the membership group to the one node experiencing the failure and quick restart, wherein the failure and quick restart deletes locally stored membership group information at the one node, and wherein the quick restart at the one node occurs prior to detection of the failure and expulsion of the one node from the membership group due to the failure, sending from the one node to the at least one other node a first message which includes at least indicia of occurrence of the quick restart at the one node, the sending being responsive to receipt of the signal at the one node, and for determining at the at least one other node, from said indicia of occurrence of said quick restart and from membership group information in storage the at least one other node indicating prior membership of the one node in the membership group, and the existence of said quick restart at said one node, and responding thereto by sending a second message from the at least one other node to another node of the membership group which indicates that said one node is to be expelled from the membership group.~~

5. (Previously Canceled).

6. (Currently Amended) The method of claim 3, wherein the indication of the quick restart indicia includes each of (1) an indication that the one node and the at least one other node are not in the adapter membership group; (2) an indication that the one node's address is part of the adapter

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membership group according to the at least one other node; and (3) an indication of difference in instantiation number for the one node's adapter ID listed in the adapter membership group.

7. (Previously Presented) The method of claim 1, wherein the first message comprises a PROCLAIM message.

8. (Currently Amended) The method of claim 1, wherein the heartbeat signal comprises a "HEARTBEAT" message, the first message comprises a "NOT YOUR NEIGHBOR" message, and the second message comprises a "DEATH" message, wherein the at least one other node forwards the "DEATH" message to a group leader node of the membership group.

9. (Previously Presented) The multinode data processing system of claim 4, in which said second message is sent by the at least one other node that is the upstream neighbor, in terms of heartbeat passing signals, of the one node that sent the first message.

10. (Currently Amended) The multinode data processing system of claim 4, wherein the membership group is an adapter membership group, and ~~in which said~~ indication of quick restart ~~indicia~~ are selected from the group consisting of (1) an indication that the one node and the at least one other node are not both in the adapter membership group; (2) an indication that the one node's address is part of the adapter membership group according to said at least one other node; and (3) an indication of difference in instantiation number for the one node's adapter ID listed in the adapter membership group.

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11. (Previously Presented) The multinode data processing system of claim 10, wherein the quick restart indicia includes each of: (1) an indication that the one node and the at least one other node are not in the adapter membership group; (2) an indication that the one node's address is part of the adapter membership group according to the at least one other node; and (3) an indication of difference in instantiation number for the one node's adapter ID listed in the adapter membership group.

12. (Previously Presented) The multinode data processing system of claim 4, wherein the first message comprises a PROCLAIM message.

13. (Currently Amended) The multinode data processing system of claim 4, wherein the heartbeat signal comprises a "HEARTBEAT" message, the first message comprises a "NOT YOUR NEIGHBOR" message, and the second message comprises a "DEATH" message, wherein the at least one other node forwards the "DEATH" message to at group leader node of the membership group.

14. (Currently Amended) At least one program storage device readable by at least one computer, tangibly embodying at least one program of instructions executable by the at least one computer to perform a method of facilitating correct group membership by detecting quick restart of liveness daemons in a distributed, multinode data processing system in which nodes communicate liveness indicia in the form of heartbeat signals via adapters coupled to each other, said method comprising:

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experiencing at one node of a membership group, a failure and a quick restart of the one node of a membership group; wherein the failure and quick restart deletes locally stored membership group information at said one node;

subsequent to said failure and quick restart of the one node of a membership group, receiving a heartbeat signal at the one node from at least one other node of the membership group;

responsive to receipt of the heartbeat signal at the one node, sending, from the one node to the at least one other node, a first message which includes an indication of the quick restart at the one node,; and

determining, at the at least one other node, from said indication of the quick restart in the first message and from locally stored membership group information indicating prior membership of the one node in the membership group, the occurrence of a quick restart at said one node, and responding thereto by sending a second message from the at least one other node to another node of the membership group which indicates that said one node is to be expelled from the membership group;

wherein the quick restart at the one node occurs prior to a detection of the failure by at least one other node and expulsion of the one node from the membership group due to the failure.

~~subsequent to a failure and quick restart at one node of a membership group, receiving a signal from at least one other node of the membership group at the one node experiencing the failure and quick restart, wherein the failure and quick restart deletes locally stored membership group information at the one node, and wherein the quick restart at the one node occurs prior to detection of the failure and expulsion of the one node from the membership group due to the failure;~~

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~~sending, from the one node to the at least one other node, a first message which includes at least indicia of occurrence of the quick restart at the one node, the sending being responsive to receipt of the signal at the one node; and~~

~~determining at the at least one other node, from said indicia of occurrence of said quick restart and from locally stored membership group information indicating prior membership of the one node in the membership group, the existence of a quick restart at said one node, and responding thereto by sending a second message from the at least one other node to another node of the membership group which indicates that said one node is to be expelled from the membership group.~~

15. (Previously Presented) The at least one program storage device of claim 14, in which said second message is sent by the at least one other node that is the upstream neighbor, in terms of heartbeat passing signals, of the one node that sent the first message.

16. (Currently Amended) The at least one program storage device of claim 14, wherein the membership group is an adapter membership group, and ~~in which~~ said indication of quick restart ~~indicia~~ are selected from the group consisting of: (1) an indication that the one node and the at least one other node are not both in the adapter membership group; (2) an indication that the one node's address is part of the adapter membership group according to said at least one other node; and (3) an indication of difference in instantiation number for the one node's adapter ID listed in the adapter membership group.

17. (Currently Amended) The at least one program storage device of claim 16, wherein the indication of the quick restart ~~indicia~~ each of (1) an indication that the one node and the at least

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one other node are not in the adapter membership group; (2) an indication that the one node's address is part of the adapter membership group according to the at least one other node; and (3) an indication of difference in instantiation number for the one node's adapter ID listed in the adapter membership group.

18. (Previously Presented) The at least one program storage device of claim 14, wherein the first message comprises a PROCLAIM message.

19. (Currently Amended) The at least one program storage device of claim 13, wherein the heartbeat signal comprises a "HEARTBEAT" message, the first message comprises a "NOT YOUR NEIGHBOR" message, and the second message comprises a "DEATH" message, wherein the at least one other node forwards the "DEATH" message to a group leader node of the membership group.

2. The following is an examiner's statement of reasons for allowance:

None of the prior art of record neither singly nor in combination teach a method for insuring correct group membership by detecting the quick restart of liveness daemons in a distributed, multimode data processing system in which nodes communicate liveness indicia in the form of heartbeat signals via adapters coupled to each node, said method comprising: experiencing at one node of a membership group, a failure and a quick restart of the one node of a membership group; wherein the failure and quick restart deletes locally stored membership group information at said one node; subsequent to a said failure and quick restart at of the one node of a membership group, receiving a heartbeat signal at the one node from at least one other node of the membership group; responsive to receipt of the heartbeat signal at the one node,

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sending, from the one node to the at least one other node, a first message which includes an indication of the quick restart at the one node, and determining, at the at least one other node, from said indication of the quick restart in the first message and from locally stored membership group information indicating prior membership of the one node in the membership group, the occurrence of a quick restart at said one node, and responding thereto by sending a second message from the at least one other node to another node of the membership group which indicates that said one node is to be expelled from the membership group; wherein the quick restart at the one node occurs prior to a detection of the failure by at least one other node and expulsion of the one node from the membership group due to the failure as recited in independent claim 1.

3. Independent claims 4 and 14 contain similar features as independent claim 1, therefore are allowed for similar reasons recited above.

Dependent claims 2-3 and 6-8, 9-13, and 15-19 depend on independent claims 1, 4, and 14, therefore are allowed for similar reasons as their respective parent claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

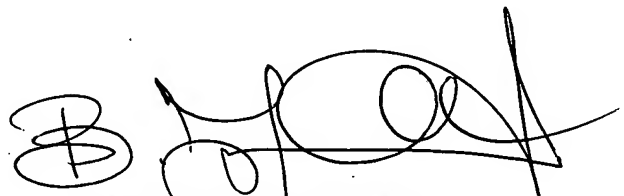
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramsey Refai whose telephone number is (571) 272-3975. The examiner can normally be reached on M-F 8:30 - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bunjob Jaroenchonwanit can be reached on (571) 272-3913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ramsey Refai
Examiner
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November 27, 2006



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